| AQA Biology (8461) from 2016 Topic B4.5 Homeostasis and response | | | | |
|---|---|---|---|---|
| **Topic** | **Student Checklist** | **R** | **A** | **G** |
| **4.5.1 Homeostasis** | Describe what homeostasis is and why it is important stating specific examples from the human body | | | |
| | Describe the common features of all control systems | | | |
| **4.5.2 The human nervous system** | State the function of the nervous system and name its important components | | | |
| | Describe how information passes through the nervous system | | | |
| | Describe what happens in a reflex action and why reflex actions are important | | | |
| | Explain how features of the nervous system are adapted to their function, including a reflex arc (inc all types of neurone and the synapse) | | | |
| | *Required practical 7: plan and carry out an investigation into the effect of a factor on human reaction time* | | | |
| | *Bio ONLY: State the function of the brain and how it is structured, including identifying he cerebral cortex, cerebellum and medulla on a diagram of the brain* | | | |
| | *Bio ONLY: Describe the functions of different regions of the brain* | | | |
| | ***Bio & HT ONLY: Explain how neuroscientists have been able to map regions of the brain to particular functions*** | | | |
| | *Bio ONLY: State the function of the eye and how it is structured, including names of specific parts* | | | |
| | *Bio ONLY: Describe the functions of different parts of the eye, including relating structure to function* | | | |
| | *Bio ONLY: Describe what accommodation is, and how it is carried out* | | | |
| | *Bio ONLY: Explain what myopia and hyperopia are and how they are treated, including interpreting ray diagrams* | | | |
| | *Bio ONLY: Describe how body temperature is monitored and controlled* | | | |
| | ***Bio & HT ONLY: Explain how the body's responses act to raise or lower temperature in a given context*** | | | |
| **4.5.3 Hormonal coordination in humans** | Describe the endocrine system, including the location of the pituitary, pancreas, thyroid, adrenal gland, ovary and testis and the role of hormones | | | |
| | State that blood glucose concentration is monitored and controlled by the pancreas | | | |
| | Describe the body's response when blood glucose concentration is too high | | | |
| | Explain what type 1 and type 2 diabetes are and how they are treated | | | |
| | **HT ONLY: Describe the body's response when blood glucose concentration is too low** | | | |
| | **HT ONLY: Explain how glucagon interacts with insulin to control blood glucose levels in the body** | | | |
| | Describe how water, ions and urea are lost from the body | | | |
| | Describe the consequences of losing or gaining too much water for body cells | | | |
| | **HT ONLY: Recall that protein digestion leads to excess amino acids inside the body and describe what happens to these** | | | |
| | Describe how the kidneys produce urine | | | |
| | **HT ONLY: Describe the effect of ADH on the permeability of the kidney tubules and explain how the water level in the body is controlled by ADH** | | | |
| | Describe how kidney failure can be treated by organ transplant or dialysis and recall the basic principles of dialysis | | | |
| | Describe what happens at puberty in males and females, inc knowledge of reproductive hormones | | | |
| | Describe the roles of the hormones involved in the menstrual cycle (FSH, LH and oestrogen) | | | |
| | **HT ONLY: Explain how the different hormones interact to control the menstrual cycle and ovulation** | | | |
| | Describe how fertility can be controlled by hormonal and non-hormonal methods of contraception (giving specific examples from the spec) | | | |
| | **HT ONLY: Explain how hormones are used to treat infertility, inc the steps in IVF** | | | |
| | **HT ONLY: Evaluate the risks and benefits of fertility treatments** | | | |
| | **HT ONLY: Describe the functions of adrenaline and thyroxine in the body, and recall where they are produced** | | | |
| | **HT ONLY: Explain the roles of thyroxine and adrenaline in the body as negative feedback systems** | | | |

| | | | | |
|---|---|---|---|---|
| **4.5.4 Plant hormones** | *Bio ONLY: Describe hormone-linked plant responses, to include phototropism and gravitropism and the role of auxin* | | | |
| | ***Bio & HT ONLY: Describe the functions of gibberellins and ethene in plants*** | | | |
| | *Required practical 8: investigate the effect of light or gravity on the growth of newly germinated seedling* | | | |
| | **HT ONLY: Explain the use of plant growth hormones are used in agriculture and horticulture (auxins, ethene and gibberellins)** | | | |

| AQA Biology (8461) from 2016 Topic B4.6 Inheritance, variation and evolution | | | | |
|---|---|---|---|---|
| **Topic** | **Student Checklist** | **R** | **A** | **G** |
| **4.6.1 Reproduction** | Describe features of sexual and asexual reproduction | | | |
| | Describe what happens during meiosis and compare to mitosis | | | |
| | Describe what happens at fertilisation | | | |
| | *Bio ONLY: Explain advantages of sexual and asexual reproduction* | | | |
| | *Bio ONLY: Describe examples of organisms that reproduce both sexually and asexually (malarial parasites, fungi, strawberry plants and daffodils)* | | | |
| | Describe the structure of DNA and its role in storing genetic information inside the cell | | | |
| | Explain the term 'genome' and the importance of the human genome (specific examples from spec only) | | | |
| | *Bio ONLY: Describe the structure of DNA, including knowledge of nucleotide units* | | | |
| | ***Bio & HT ONLY: Explain complementary base pairing in DNA*** | | | |
| | ***Bio & HT ONLY: Explain the relationship between DNA bases (ATCG), amino acids and proteins*** | | | |
| | ***Bio & HT ONLY: Describe how proteins are synthesised on ribosomes, including protein folding and its importance for protein function*** | | | |
| | ***Bio & HT ONLY: Explain what mutations are, and the possible effects of mutations*** | | | |
| | ***Bio & HT ONLY: Explain what non-coding parts of DNA are, and why they are important*** | | | |
| | Describe how characteristics are controlled by one or more genes, including examples | | | |
| | Explain important genetic terms: gamete, chromosome, gene, allele, genotype, phenotype, dominant, recessive, homozygous and heterozygous | | | |
| | Explain and use Punnet square diagrams, genetic crosses and family trees | | | |
| | **HT ONLY: Construct Punnet square diagrams to predict the outcomes of a monohybrid cross** | | | |
| | Describe cystic fibrosis and polydactyly as examples of inherited disorders | | | |
| | Evaluate social, economic and ethical issues concerning embryo screening when given appropriate information | | | |
| | Describe how the chromosomes are arranged in human body cells, including the function of the sex chromosomes | | | |
| | Explain how sex is determined and carry out a genetic cross to show sex inheritance | | | |
| **4.6.2 Variation and evolution** | Describe what variation is and how it can be caused within a population | | | |
| | Describe mutations and explain their influence on phenotype and changes in a species | | | |
| | Explain the theory of evolution by natural selection | | | |
| | Describe how new species can be formed | | | |
| | Describe what selective breeding is | | | |
| | Explain the process of selective breeding, including examples of desired characteristics and risks associated with selective breeding | | | |
| | Describe what genetic engineering is, including examples, and how it is carried out | | | |
| | Explain some benefits, risks and concerns related to genetic engineering | | | |
| | **HT ONLY: Explain the process of genetic engineering, to include knowledge of enzymes and vectors** | | | |
| | *Bio ONLY: Describe different cloning techniques, to include: tissue culture, cuttings, embryo transplants and adult cell cloning* | | | |
| **4.6.3 The development of understanding of genetics and evolution** | *Bio ONLY: Describe the ideas proposed by Darwin in his theory of natural selection and explain why this theory was only gradually accepted* | | | |
| | *Bio ONLY: Describe other inheritance-based theories that existed (apart from the theory of natural selection), and the problems with these theories* | | | |
| | *Bio ONLY: Describe the work of Alfred Russel Wallace* | | | |
| | *Bio ONLY: Explain how new species can be formed* | | | |
| | *Bio ONLY: Describe how our understanding of genetics has developed over time, to include knowledge of Mendel* | | | |
| | Describe some sources of evidence for evolution | | | |
| | Describe what fossils are, how they are formed and what we can learn from them | | | |
| | Explain why there are few traces of the early life forms, and the consequences of this in terms of our understanding of how life began | | | |
| | Describe some of the causes of extinction | | | |
| | Describe how antibiotic-resistant strains of bacteria can arise and spread (inc MRSA) | | | |

| | | | | |
|---|---|---|---|---|
| | Describe how the emergence of antibiotic-resistant bacteria can be reduced and controlled, to include the limitations of antibiotic development | | | |
| **4.6.4 Classification** | Describe how organisms are named and classified in the Linnaean system | | | |
| | Explain how scientific advances have led to the proposal of new models of classification, inc three-domain system | | | |
| | Describe and interpret evolutionary trees | | | |

| AQA Biology (8461) from 2016 Topic B4.7 Ecology | | | | |
|---|---|---|---|---|
| **Topic** | **Student Checklist** | **R** | **A** | **G** |
| **4.7.1 Adaptations, interdependence and competition** | Recall what an ecosystem is | | | |
| | Describe which resources animals and plants compete for, and why they do this | | | |
| | Explain the terms 'interdependence' and 'stable community' | | | |
| | Name some abiotic and biotic factors that affect communities | | | |
| | Explain how a change in an abiotic or biotic factor might affect a community | | | |
| | Describe structural, behavioural and functional adaptations of organisms | | | |
| | Describe what an extremophile is | | | |
| **4.7.2 Organisation of an ecosystem** | Represent the feeding relationships within a community using a food chain and describe these relationships | | | |
| | Explain how and why ecologists use quadrats and transects | | | |
| | Describe and interpret predator-prey cycles | | | |
| | *Required practical 9: measure the population size of a common species in a habitat. Use sampling to investigate the effect of one factor on distribution* | | | |
| | Describe the processes involved in the carbon cycle | | | |
| | Describe the processes involved in the water cycle | | | |
| | *Bio ONLY: Explain how temperature, water and availability of oxygen affect the rate of decay of biological material* | | | |
| | *Bio ONLY: Explain how the conditions for decay are optimised by farmers and gardeners, and the reasons for this* | | | |
| | *Bio ONLY: Describe how methane gas can be produced from decaying materials for use as a fuel* | | | |
| | *Bio ONLY: Required practical 10: investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change* | | | |
| | *Bio ONLY: Explain how environmental changes can affect the distribution of species in an ecosystem (temperature, water and atmospheric gases)* | | | |
| **4.7.3 Biodiversity and the effect of human interaction on ecosystems** | Describe what biodiversity is, why it is important, and how human activities affect it | | | |
| | Describe the impact of human population growth and increased living standards on resource use and waste production | | | |
| | Explain how pollution can occur, and the impacts of pollution | | | |
| | Describe how humans reduce the amount of land available for other animals and plants | | | |
| | Explain the consequences of peat bog destruction | | | |
| | Describe what deforestation is and why it has occurred in tropical areas | | | |
| | Explain the consequences of deforestation | | | |
| | Describe how the composition of the atmosphere is changing, and the impact of this on global warming | | | |
| | Describe some biological consequences of global warming | | | |
| | Describe both positive and negative human interactions in an ecosystem and explain their impact on biodiversity | | | |
| | Describe programmes that aim to reduce the negative effects of humans on ecosystems and biodiversity | | | |
| **4.7.4 Trophic levels in an ecosystem** | *Bio ONLY: Describe the different trophic levels and use numbers and names to represent them* | | | |
| | *Bio ONLY: Describe what decomposers are and what they do* | | | |
| | *Bio ONLY: Construct pyramids of biomass accurately from data and explain what they represent* | | | |
| | *Bio ONLY: State how much energy producers absorb from the Sun and how much biomass is transferred* | | | |
| | *Bio ONLY: Explain how biomass is lost between trophic levels, including the consequences of this and calculate efficiency between trophic levels* | | | |
| **4.7.5 Food production** | *Bio ONLY: Explain the term 'food security' and describe biological factors that threaten it* | | | |
| | *Bio ONLY: Explain how the efficiency of food production can be improved* | | | |
| | *Bio ONLY: Explain the term 'factory farming', including examples, and ethical objections* | | | |
| | *Bio ONLY: Explain the importance of maintaining fish stocks at a level where breeding continues* | | | |
| | *Bio ONLY: Explain some methods that can help to conserve fish stocks* | | | |
| | *Bio ONLY: Describe how modern biotechnology is used in food production, including the fungus Fusarium as an example* | | | |
| | *Bio ONLY: Describe the uses of genetically modified organisms in insulin and food production* | | | |